THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GORAN HAMMARBERG

Appeal No. 97-2806
Application 08/391,234[1]

ON BRIEF

Before HAIRSTON, KRASS, and JERRY SMITH, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 9 through 21, all of the claims pending in the application.

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[1] Application for patent filed February 21, 1995.

The invention pertains to sensors for detecting the degree of ionization in a combustion chamber in combustion engines with direct fuel injection and to combustion engines equipped with such sensors. More particularly, rather than separately locating the sensor in the combustion chamber or incorporating the sensor in other engine components, the invention seeks to obviate the creation of new holes in the combustion chamber and to minimize costs by locating the sensor in the same duct as the fuel injector.

Representative independent claim 9 is reproduced as follows:

9. A sensor for detecting a degree of ionization in a combustion chamber of a combustion engine, which combustion chamber is partly bounded by a cylinder head having a duct which opens into the chamber and in which a fuel injector for injecting fuel directly into the combustion chamber is arranged, the sensor comprising: a substantially sleeve-shaped electrode arranged in the duct surrounding the fuel injector, the electrode being in communication with the combustion chamber and means connected to the electrode for detecting the degree of ionization in the combustion chamber.

The examiner relies on the following references:

Kizler et al. (Kizler)	4,359,893	Nov. 23, 1982
Suzuki et al. (Suzuki)	4,461,170	Jul. 24, 1984
Bullis et al. (Bullis)	4,463,729	Aug. 7, 1984

Claims 9 through 21 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner cites Kizler, Suzuki and Bullis.

Reference is made to the briefs and answers for the respective positions of appellant and the examiner.

OPINION

We reverse.

The initial burden is on the examiner to establish a case of prima facie obviousness. In our view, the examiner has not presented such a case.

The examiner contends that Kizler discloses all the subject matter of instant claims 9 and 11 through 21 but for the electrode surrounding a fuel injector. Instead, Kizler discloses a spark plug. The examiner then relies on Suzuki for the teaching of surrounding a fuel injector with a combustion condition detector even though the examiner recognizes that Suzuki employs an optical ion detector. Finally, the examiner cites Bullis for the teaching of surrounding a fuel injector with a start of combustion (SOC) sensor. Bullis does recognize that the sensor may be for sensing ionization accompanying the onset of combustion [column 5, lines 58-59 of Bullis].

The examiner then concludes that it would have been obvious, within the meaning of 35 U.S.C. § 103, to modify Kizler by surrounding a fuel injector, rather than a spark plug, with a combustion detector as taught by Suzuki, motivated by Bullis' teaching of a substantially sleeve-shaped electrode serving as an ionization detector being incorporated in the structure of a fuel injector [see page 4 of the principal answer].

First, independent claims 9 and 20 require a fuel injector which injects fuel into the combustion chamber and around which the sleeve-shaped electrode is arranged. Although the examiner contends that incorporation of an ionization sensor with either a spark plug or a fuel injector is viewed as "functionally equivalent alternatives," [page 5 of the principal answer], the examiner has provided no evidence to support this allegation. As such, for whatever Kizler teaches about ionization detectors and sleeve-shaped electrodes, Kizler teaches it in regard to surrounding a spark plug, not a fuel injector.

Second, Suzuki clearly shows a fuel injector but there is no ionization sensor taught therein. Instead, Suzuki is interested in detecting a combustion flame and transmitting the light from the flame via a light path to a photoelectric transducer in order to determine an actual time of combustion. Essentially, then,

the only relevance Suzuki appears to have to the instant claimed invention is in the teaching of a fuel injector. Suzuki does not teach or suggest the claimed type of sensor, the claimed electrode or the electrode surrounding the fuel injector. Accordingly, the examiner's rationale for substituting the fuel injector of Suzuki for the spark plug of Kizler appears to have been motivated merely by appellant's disclosure rather than by anything suggested by the applied references.

Further, the requirement of the instant claims that the electrode surrounds the fuel injector makes it clear that the sensor, which comprises the sleeve-shaped electrode arranged in the duct surrounding the fuel injector, is separate from the fuel injector itself. Yet, while the examiner relies on Bullis for the teaching of surrounding the fuel injector with a sensor, it is clear from Bullis that either the sensor and fuel injector are entirely separate units located apart from each other [See Figures 1 and 6, for example] or, in Bullis' alternative embodiment [See column 15, lines 52-55], the sensor is "incorporated" in, i.e., made integral with, the structure of the injector. Thus, we find no teaching or suggestion in the applied references of providing distinct fuel injector and sensor units

within the same duct by surrounding the fuel injector with the sensor, as claimed.

While the examiner has certainly found bits and pieces of the instant claimed subject matter taught by the prior art, as represented by the applied references, we find ourselves in agreement with appellant that the only way the artisan would have reconstructed the instant claimed invention from the teachings of the cited references would have been by "making modifications to the prior art structure using appellant's claims as a blueprint" [page 3 of the reply brief]. Basing a conclusion of obviousness on such hindsight is clearly improper under 35 U.S.C. § 103.

The examiner's decision rejecting claims 9 through 21 under 35 U.S.C. § 103 is reversed.

REVERSED

Kenneth W. Hairston Administrative Patent Judge	)
Errol A. Krass Administrative Patent Judge	) BOARD OF PATENT) APPEALS AND) INTERFERENCES
Jerry Smith Administrative Patent Judge	)

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